Dugway Proving Ground
Restoration Advisory Board Meeting

November 17, 2008
Dugway Proving Ground
Dugway, Utah

PROJECT UPDATES

Keller Davis - Shaw Environmental, Inc.

Groundwater Monitoring

Groundwater Management Areas

Regional/Holistic Approach

- Divide DPG into four regions based on hydrogeology
- Focus on worst case contamination
  - Higher concentrations
  - Larger plumes
  - Migrating vertically
- Define consistent monitoring program
  - Standardized across region (vertical, horizontal, and temporal)
  - Target analyses to known contaminants
- Define exit strategy

Ditto GMA Year 0 Activities

- High Frequency Water Levels (HFWL) every 15 minutes at 5 wells
- Quarterly water levels from all wells across Ditto
- Install shallow and deep source area wells
- Validate plume migration models proposed in the plan
- Propose sampling schedule to coincide with annual high (May) and low (October) water table
- Propose downgradient well locations

Ditto GMA Year 0 Results

- HFWL data showed annual high water table occurs in May; low water table occurs in October
- Quarterly water levels detected and quantified groundwater mounds
- Plume modeling validated the downgradient well locations proposed in the plan
- Shallow and deep source wells installed

Ditto GMA Year 1 Activities

- Year 1 (June 2007 – June 2008):
  - Install downgradient wells
  - Conduct semiannual sampling at shallow source area wells (May and October)
  - Conduct annual sampling at shallow and deep source area and downgradient wells (May)
  - Conduct annual water level measurements at all Ditto and Carr wells (May)
  - **Report findings (due January 2009)**

Ditto GMA Contaminants

- Chlorinated Solvents

  Trichloroethene (TCE) & Tetrachloroethene (PCE)

  – Industrial Uses
    - Solvent
    - Degreaser

  – DPG Uses
    - Industrial Uses
    - Former chemical agent decon solution component (chlorine source)

Contaminant Concentrations

Results reported in micrograms per liter (ug/L)

- Parts per Billion
- 10,000,000 ug/L = 1%
- EPA residential tap water toxicity concentrations
  - PCE = 0.11 ug/L
  - TCE = 1.7 ug/L
- EPA Maximum Contaminant Level (MCL)
  - PCE = 5 ug/L
  - TCE = 5 ug/L

Ditto GMA Well Construction

HP = Hydropunch

- Direct (hydraulic) push technology
- No lithology data because no cuttings
- Small diameter → discrete sample; less volume
- Short screen interval (1-5 feet)
- Quick → cheap
- Capable of collecting water sample from clay interval → higher concentrations
- After sample collected, all hardware retrieved

Ditto GMA Well Construction

TW = Temporary Well

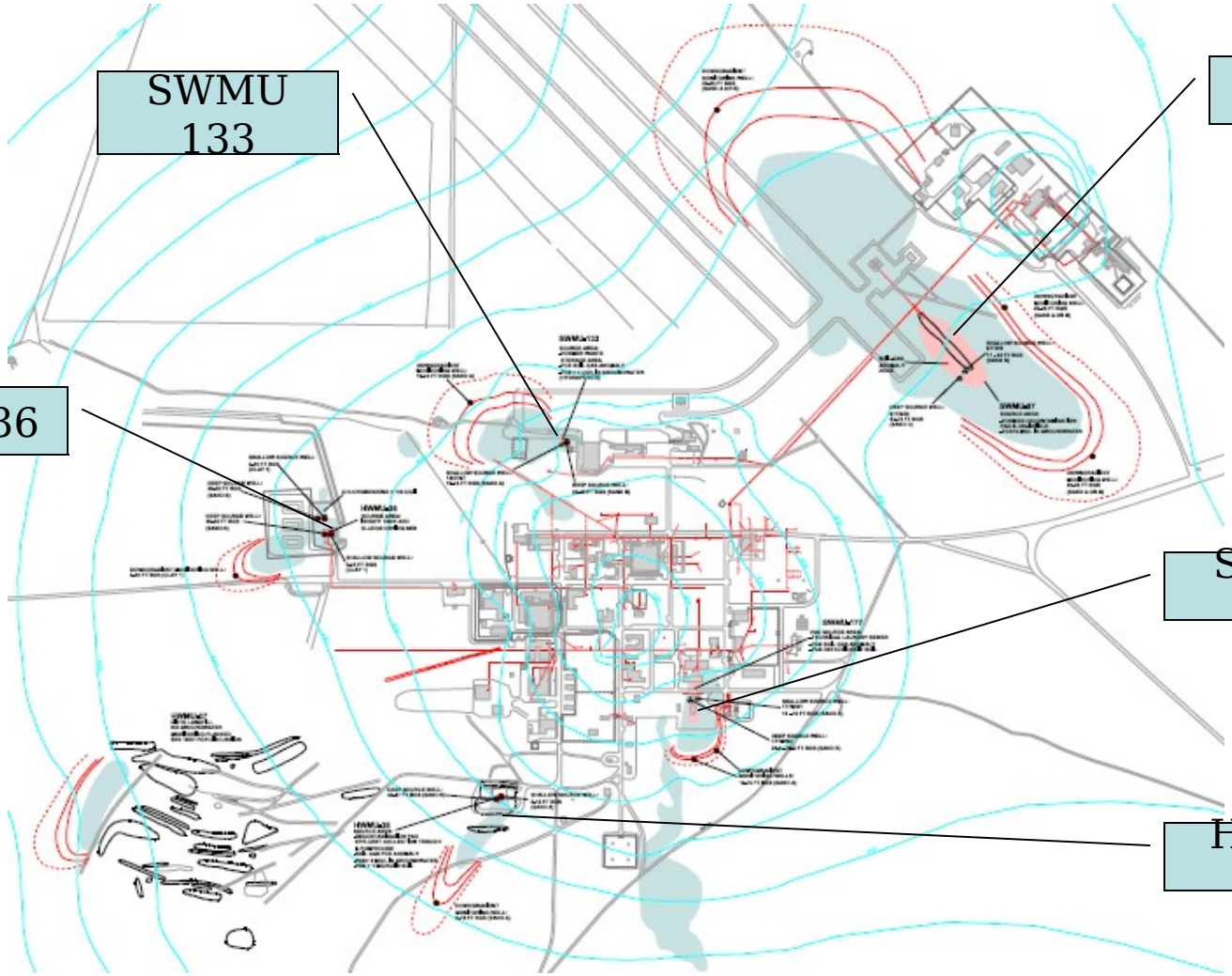
- Direct (hydraulic) push technology
- Lithology data collected
- Mid-size diameter
- Short screen interval (3-5 feet)
- Pre-packed well screen
- Quick → cheap
- Installation time advantage of HP, data more in line with traditional monitoring wells
- Not as durable as monitoring well

Ditto GMA Well Construction

MW = Monitoring Well

- Auger drilling
- Lithology data collected
- 2-4 inch diameter
- Screen intervals range from 5-15 feet
- Installation quick; development longer
- More representative of a residential receptor
- Most durable construction technique
- Best for recurring sampling programs

Ditto GMA Contamination



Source: Final Ditto GMA (Parsons, 2004)

HWMU 36 – Former Sewer Imhoff Tank

Well	Location	Contaminant	Historic High	Oct-07	May-08
036-MW02	Historic Shallow TCE Source (Clay 1 + Sand A)	TCE	2,270		
036-HP60	Historic Shallow Chlorobenzene Source (Sand A)	Chlorobenzene	5,825		
036-MW12	Shallow TCE Source (Sand A)	TCE		130	180
036-MW14	Shallow Chlorobenzene Source (Sand A)	Chlorobenzene		1,600	1,700
036-MW13	Deep TCE Source (sand B)	TCE			0
036-MW15	Deep Chlorobenzene Source (Sand B)	Chlorobenzene			1
036-MW16	Downgradient (Sand A)	TCE			0.6
		Chlorobenzene			0

All concentrations in ug/L

HWMU 38 – Elevated Decon Pad

Contaminant = PCE

Well	Location	Historic High	Oct-07	May-08
038-HP18	Historic Shallow Source (Clay 1)	7,320		
038-MW02	Historic Shallow Source (Clay 1 + Sand A)	5,690		
038-MW06	Shallow Source (Sand A)		16	19
038-MW07	Deep Source (Sand B)			0
038-MW08	Downgradient (Sand A)			0

All concentrations in ug/L

SWMU 97 – MAAF Drainfield

Contaminant = TCE

Well	Location	Oct-00	Oct-07	May-08
097-TW08	Shallow Source (Sand B)	2,310	1,300	1,500
097-TW20	Deep Source (Sand D)			2
097-MW07	Downgradient (Sand A/B)			0
097-MW08	Downgradient (Sand A/B)			0
097-MW09	Downgradient (Sand A/B)			0

All concentrations in ug/L

SWMU 133 – Hanger Drainfield

Well	Location	Contaminant	Historic High	Oct-07	May-08
133-HP29	Historic Shallow TCE Source (Clay 1)	TCE	94		
133-HP29	Historic Shallow PCE Source (Clay 1)	PCE	1,900		
133-TW07	Shallow Source (Sand A)	TCE	100	25	52
		PCE	510	51	70
133-MW06	Deep Source (Sand B)	TCE			0
		PCE			0
133-TW14	Downgradient (Sand A)	TCE			0.4
		PCE			0

All concentrations in ug/L

SWMU 177 – Ditto Tech Laundry

Well	Location	Contaminant	Historic High	Oct-07	May-08
177-HP044	Historic Shallow TCE Source (Sand A)	TCE	24		
177-HP143	Historic Shallow PCE Source (Sand A)	PCE	1,700		
177-MW01	Shallow Source (Sand A)	TCE		1	0.3
		PCE		37	15
177-MW02	Deep Source (Sand B)	TCE			0
		PCE			0.9
177-MW03	Downgradient (Sand A)	TCE			0.5
		PCE			0
177-TW23	Downgradient (Sand A)	TCE			0.4
		PCE			6.1

All concentrations in ug/L

Questions?